

Paradoxical Response after MIST for Spinal Tuberculosis Worsened Neurologic Symptoms: A Case Report

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Minimally invasive spine stabilization (MIST) using percutaneous pedicle screws (PPS) is becoming increasingly useful in the treatment of spondylodiscitis and spinal tuberculosis (TB)¹. Although anterior curettage and bone grafting are basic surgical procedures in such interventions, a recent report has described infection resolution with posterior instrumentation alone². This report describes a case of epidural abscess that resolved with MIST and recurred after initiation of TB treatment, a phenomenon known as a paradoxical response (PR).

A 58-year-old woman with no relevant medical history presented to our hospital with complaints of back pain, general malaise, and lymphadenopathy in the left supraclavicular fossa. Computed tomography showed a nodular shadow

in the upper lobe of the left lung and a pathological fracture at T6 (Fig. 1A, 1B). Magnetic resonance imaging (MRI) showed signal hyperintensity at T6,7 and epidural abscess on T2-weighted imaging (Fig. 1C). The leukocyte count of 8900/ μ L, C-reactive protein level of 0.38 mg/dL and positive result for T-SPOT.TB test on blood biochemistry led us to suspect spinal TB. No neurological deficits such as motor palsy or sensory disturbance were identified. As gastric juice and sputum cultures were negative for *Mycobacterium tuberculosis*, no definitive diagnosis could be made. Back pain gradually worsened and bone destruction progressed, so biopsy and posterior fixation with PPS at the T4-9 level was performed without nerve decompression (Fig. 2). PCR of the biopsy specimen from the vertebral body confirmed TB;

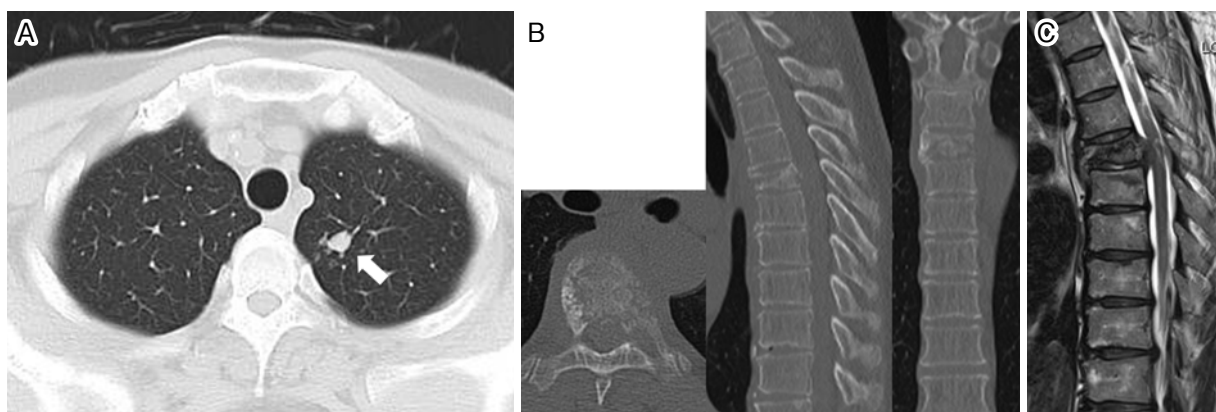


Figure 1. Preoperative imaging. A) Axial computed tomography (CT) of the chest. White arrow shows a nodular shadow in the upper lobe of the left lung. B) CT of the thoracic spine. Pathological fracture is evident at T6. C) Preoperative sagittal T2-weighted magnetic resonance imaging. Epidural abscess is seen compressing the spinal cord.

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thus, antitubercular drugs (isoniazid, rifampicin, pyrazinamide, and ethambutol) were started on postoperative day 2. Back pain improved, inflammatory response disappeared, and MRI confirmed the disappearance of the epidural abscess (Fig. 3A). However, two months postoperatively, the patient gradually developed gait disturbance and bladder/bowel dysfunction and was transferred to the emergency room. Motor weakness (hip flexion, knee extension, ankle dorsiflexion, and planter flexion: 3/3, 4/4, 5/5, and 5/5, respectively), bilateral positive Babinski reflexes, dysuria, and weakness of the anal sphincter were identified. MRI of the thoracic spine showed recurrence of the epidural abscess that had previously disappeared (Fig. 3B); therefore, T6,7 laminectomy was performed. The patient underwent anterior

curettage and iliac bone and rib grafting as a standby procedure to achieve cure (Fig. 4). Two years postoperatively, instrumentation was removed from the patient after bone fusion was confirmed, and no recurrence of infection was observed.

With continued improvement to the PPS system, MIST can be applied to long fixation of tumors and infections³⁾. Guo et al. reported good results with PPS-only fixation of early spinal TB⁴⁾. Spinal TB is reported to occur in ~150 patients

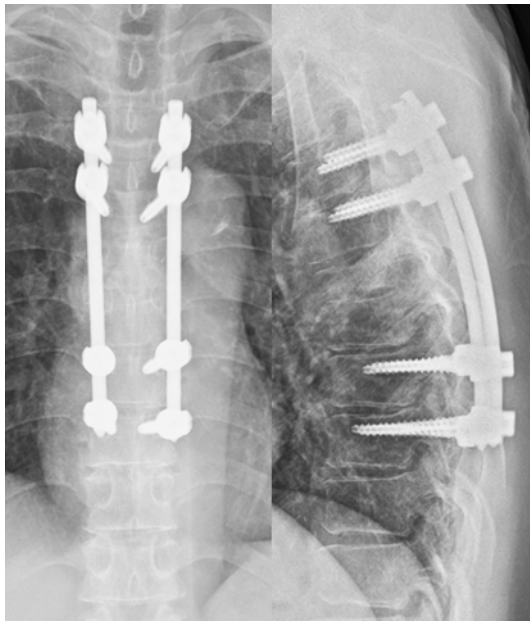


Figure 2. Postoperative X-ray shows T4–9 fixation with percutaneous pedicle screws.



Figure 3. Sagittal T2-weighted magnetic resonance imaging (MRI). A) After the initial operation. White arrow shows the location of the epidural abscess. B) MRI after onset of paralysis of the lower extremities. White arrow shows the recurrence of the epidural abscess that had previously disappeared.



Figure 4. After anterior fusion. A) Postoperative X-ray. B) Computed tomography of the thoracic spine. Iliac and rib grafts are seen at T6,7.

per year in Japan, accounting for ~1% of all cases of TB⁵). Although advances in antitubercular drugs have reduced the number of patients, diagnosis and treatment can be time-consuming and difficult. PR is a known problem after starting TB treatment, causing existing TB lesions to worsen or new TB lesions to appear in patients whose clinical symptoms initially improved with the administration of antitubercular drugs⁶. PR is conjectured to represent a delayed local immune response or dysregulation of cellular immune responses to a large number of rapidly killed *M. tuberculosis* components⁷. Velivela et al. reported an increased risk of epidural abscesses with PR in patients with spinal TB, necessitating, as in this case, surgery in half of the cases⁸.

In conclusion, MISt is a useful procedure. However, in cases of spinal TB, the risk of abscess may increase after the first dose of antitubercular drugs. Therefore, it is crucial to promptly recognize PR after MISt based on physical and imaging findings.

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of Helsinki and the laws and regulations of Japan.

Informed Consent: Informed consent was obtained from the patient for the publication of her clinical data and photographs.

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